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February 10, 2004

Commanding Officer
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Southwest Division
1220 Pacific Highway
San Diego, CA 92132-5190
Attention: Keith Forman

DRAFT SAMPLING AND ANALYSIS PLAN (FIELD SAMPLING PLAN AND QUALITY ASSURANCE PROJECT PLAN) BASEWIDE GROUNDWATER MONITORING PROGRAM, HUNTERS POINT SHIPYARD, SAN FRANCISCO, CALIFORNIA, DECEMBER 2003

Dear Mr. Forman

California Department of Toxic Substances Control (DTSC) has reviewed the above mentioned document dated December 30, 2003. We focused our review on Parcel B groundwater monitoring since Parcel B groundwater monitoring is dictated by the Parcel B Remedial Action Monitoring Plan. We will forward additional comments on Parcels C, D, and E groundwater monitoring by March 10, 2004. Attached please find our comments for your consideration.

If you have any questions regarding these comments, please contact me at (510) 540-3776.

Sincerely,

Thomas P. Lanphar
Senior Hazardous Substance Scientist
Office of Military Facilities

cc: Mr. Michael Work
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Memorandum

Hunters Point Shipyard: Basewide Groundwater Monitoring Plan (BGMP): Parcel B Comments

At your request, I have reviewed: Draft Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Basewide Groundwater Monitoring Program, Hunters Point Shipyard, San Francisco, California (BGMP), dated December 18, 2003. The BGMP was prepared for Department of the Navy, Southwest Division, Naval Facilities, Engineering Command, San Diego, California (Navy) by Tetra Tech EM Inc.

Parcel B Comments are provided in this memorandum. Comments on Parcels C, D and E and General Comments will be provided in a future memorandum.

Parcel B Comments

1. RAMP vs. BGMP at Parcel B. It is not appropriate to "incorporate" Parcel B Remedial Action Monitoring Plan (RAMP) requirements into the BGMP. All RAMP modifications and RAMP monitoring should be addressed inside the RAMP regulatory framework as per the Federal Facility Agreement (FFA). The RAMP reporting requirements must also be complied with (e.g., quarterly reports and annual reports as described in the RAMP). Removing RAMP wells, replacing RAMP sentinel wells and RAMP point-of-compliance (POC) wells, changing the total number of RAMP wells, changing RAMP well locations, and changing analytical program or trigger levels--all require revisions of the RAMP (a primary document). Proposing such changes inside this draft BGMP (a secondary document) is not acceptable regulatory process. Such proposals should be removed from the BGMP and submitted as a separate proposed RAMP revision. Of course, it is appropriate to propose additional non-RAMP work on Parcel B within the BGMP.

2. BGMP and ROD Requirements at Parcel B.
   a) In the BGMP, IR06 is shown as located in Parcel C. However, IR06 is within the boundaries of Parcel B in the Parcel B ROD. Similarly, in the BGMP, the Parcel B boundary adjacent to IR25 has been shifted about 50 feet to the west and about 25 feet to the south into Parcel C, which is not consistent with the ROD. Please revise the BGMP to be consistent with the ROD: delineation of new parcel boundaries should be addressed in a ROD amendment.

   b) The Navy assumes (e.g., RAMP revision 3) that since soil sources have been removed, groundwater monitoring is not required: this has not been substantiated. Moreover, continued monitoring is explicitly required by the ROD. The ROD says: "...groundwater will be closely monitored while source removal

is implemented."

c) But, because Parcel B wells have been removed: data has not been collected, potential threats to the bay have not been monitored, impacts on groundwater of remedial actions along the shoreline have not been monitored, and IR10 VOC plumes have not been monitored as required by the ROD. These instances of non-compliance have been previously noted by agencies in comments on quarterly and annual reports. Removed wells include: all six "post-remedial action (PRA)" wells (Figure 4: IR07MW20A1, 21A1, 21A2, 24A, 25A, IR07MWS3), two point-of-compliance (POC) wells (Figures G-1 and 4: IR07MWS-4 and IR26MW45A), two on/off site migration wells (Figure G-1: IR18MW21A and IR07MW28A), and one volatile organic compound (VOC) monitoring well (Figure G-1: IR10MW33A).

d) "Potential" nickel and TCE plumes are designated on figures in the BGMP. The word "potential" should be deleted: these plumes were identified in the ROD and are not considered "potential".

e) Criteria for total petroleum hydrocarbons (TPH) are incorporated into the ROD by reference to the Corrective Action Plan (CAP: January 10, 2001), under oversight of the Regional Water Quality Control Board (RWQCB): please include (TPH) criteria.

3. <u>BGMP vs. Parcel B RAMP</u>

a) In the BGMP, the Navy has not provided sufficient rationale for RAMP replacement wells (Table F-2). For example, the Navy should explain why one well (IR07MW29A) will suffice to replace three removed RAMP wells (i.e., wells IR07MW21A1, 24A and 25A). Also, no replacement well is proposed in the vicinity of IR07MW20A1 or for point-of-compliance (POC) well IR26MW45A.

b) Groundwater data has not been collected post-remedial action, as required by the ROD (since wells were removed). Also, all soil data has not been received and reviewed. So, proposed new well locations downgradient of IR07 and IR18 and other source areas cannot be fully evaluated with respect to current groundwater contamination. Purportedly, soil contamination in the IR07/18 area is widespread and concentrations are high. If so, then more wells (not fewer) might be needed in and downgradient of IR07 and IR18, to monitor potential threats to the San Francisco Bay.

c) Similarly, with respect to the removed IR10 VOC well, all data (soil, groundwater and soil gas) has not been received (e.g., IR10 treatability study (TS) reports soil vapor extraction (SVE) and zero valent injection (ZVI)), so proposed new well locations cannot be fully evaluated. Purportedly, the VOC plume has expanded at IR10, so careful review of all new data is required prior to evaluating new well locations.

d) At IR10, there is no aquitard separating the A- and B-aquifers, the B-aquifer has not been investigated, and dense non-aqueous phase liquids (DNAPLs) have not been ruled out (as noted in previous comments). Installation of wells into the B zone would be prudent, especially given the TSs (e.g., SVE and ZVI) performed at IR10.

e) The proposed location for IR07MW30A is not adequate as a replacement well for POC well IR07MWS-4 since 30A is not located at the "high-tide line of the Parcel B tidally influenced zone (TIZ), which is the point of compliance (POC)", as required.

f) Well designations in the BGMP do not agree with RAMP well designations (RAMP revision 1: May 19, 1999). For example, the RAMP identifies 4 "VOC monitoring wells" (Section 2.2.1.4): IR10MW33A, IR10MW28A (which is also a sentinel well) and IR50MW01A and IR10MW31A (which are also POC wells). The BGMP identifies IR10MW33A as a VOC monitoring well (in agreement with the RAMP) but does not cite the other three RAMP VOC monitoring wells. The BGMP designates 5 other wells as VOC monitoring wells. These are IR10MW59A, IR10MW13A, IR10MW14A, IR25MW17A and IR10MW12A (which is also a hexavalent chromium monitoring well). Although it is appropriate to have additional monitoring wells for VOCs at IR10 (and elsewhere on Parcel B), discrepancies in well designation are confusing. Please maintain RAMP designations for wells: if these have been formally changed (in primary documents), please cite documentation in support of changes, with agency approvals.

g) All wells which are non-RAMP wells in Parcel B for either ground water level monitoring or sampling should be called by the same designation: "supplemental monitoring wells" would suffice. Further re-designation could be proposed in a future RAMP revision or ROD amendment.

h) Regarding the analytical program, the RAMP says (Section 2.2.3): "Groundwater samples will be analyzed for the detected organic or inorganic constituents previously detected in the associated plume, at a minimum." TPH sampling is also required. Note that the RAMP does not say that only analytes above trigger levels need to be included in the analytical program. (Trigger levels are action levels, not screening levels for inclusion in the analytical program.) Please confirm that the proposed analytical program for RAMP wells fully satisfies the RAMP minimum requirements and that all compounds detected in the vicinity of each well have been maintained in the analytical program.

i) All method analytes should be analyzed for. A subset of method analytes is not acceptable. RAMP tables indicate methods for analysis--not subsets of method analytes (e.g., Table 2). Change in sampling frequency is discussed in the RAMP but change in analytes is not discussed except as part of the 5 year review process. For example, subsets of metals, subsets of semi-volatile organic

compounds (SVOCs), or a single polychlorinated biphenyl (PCB: e.g., Aroclor 1260) are not acceptable. Please revise BGMP Table 7A accordingly.

BMGP Section 8.5 Analytical Methods says: "Appendix C presents the *individual target analytes* for this investigation and there associated PRQLs..." (Emphasis added). Use of the term "individual target analytes" is not recommended. This has been discussed at length in comments on the Parcel B soil sampling plans and in DGIs. Please clarify whether analysis for a subset of method analytes is implied by this term: if so, please delete.

j) VOC plumes should be defined to new lower human-health criteria for inhalation risks (e.g., the Navy's estimate was 5 ug/L for TCE at IR10). And, in scoping meetings for the BGMP, it was agreed that all organic plumes (including VOCs) would be defined to non-detect ("ND") levels. Please confirm that all wells needed for ND-level of plume definition for VOCs have been included in the BGMP (at IR10, IR06 and IR25 where the plume underlies Parcel B).

Similarly, please include wells for defining the polynuclear aromatic hydrocarbon (PAH) plume near utility well IR06MW42A. At IR06MW42A, trigger levels are defined with respect to sanitary system discharge requirements which are greater than human-health criteria. PAHs are below these trigger levels. But, the extent of PAHs has not been defined with respect to human-health risks (e.g., the PRG for benzo(a)pyrene is 10 ug/L). Since SVOCs may be elevated in the IR06 tank farm area, analysis for SVOCs is recommended in the IR06 area.

k) DTSC had previously requested (e.g., letter: October 17, 2002) that IR10MW13A2 be included as a monitoring well at IR10 since it is screened in a deeper zone than 13A1: please include on Table 7A.

l) Organotin should be added to all wells in areas where sandblast grit was used (sub-base and painting areas), stored (e.g., IR06), or disposed (e.g., IR07 disposal pits), as previously requested.

m) Please clarify that manganese is included in USEPA's Contract Laboratory Program (CLP) for metals: if not, please add.

n) Similarly, confirm whether mercury (Hg) is a CLP metal: if not, it should be added as an analyte, especially for wells in the vicinity of IR 25 (TM Figure 4-15) and IR20 where aquatic exceedences are not uncommon.

o) Hexavalent chromium (CrVI) should be included for IR10 wells since the plume overlaps the VOC plume and extends over a large area, especially if human-health criteria are considered (Technical Memorandum Parcel B Groundwater Evaluation (TM Figure 4-12). DTSC has previously requested (e.g., letter October 17, 2002) that the following wells be analyzed for CrVI: IR10MW33A and 59A. Please include CrVI as an analyte for these wells on Table 7A. CrVI

should also be included as an analyte for IR25 wells with previous hits (TM, Figure 4-12), and for nearby wells.

p) More wells should be analyzed for 1,4-dioxane in VOC plume areas, including IR10, IR25 and IR06, and in areas where painting and stripping operations occurred. Again, the Navy should request all method analytes (not just 1,4-dioxane).

q) With respect to manganese (Mn), large areas of Parcel B have high concentrations—up to 18,200 ug/L (TM Figure 4-14), greatly exceeding human-health criteria (e.g., IRIS drinking water level of 300 ug/L). No aquatic criteria are presented for Mn: DTSC defers to the RWQCB with respect to ecological criteria for Mn.

r) The RAMP Section 2.2.2 says: "The depth of new monitoring wells will typically be from 15 to 20 feet below ground surface. The bottom of each well will be a minimum of 5 feet below the A-aquifer lowest groundwater table. Monitoring wells installed in areas of soil excavations (for example, in remediation area 7-1) or in areas of limited drilling access may be installed in an open excavated hole and backfilled with clean sand materials." Specific well installation, construction, surveying and development instructions and requirements are stipulated in Section 2.2.2.1. Specific sampling requirements (e.g., "low-flow (minimal drawdown)" sampling, filtering, and stabilization criteria) are stipulated in Section 2.2.2.3 et seq. Confirm that all wells, including supplemental monitoring wells, meet these requirements. For wells installed in excavations, please provide chemical analytical reports showing that excavations were backfilled with clean sand, as required.

s) The proposed groundwater level monitoring program for Parcel B is acceptable for the A-aquifer (except as noted below). However, the program is not adequate in that horizontal gradients and flow directions will not be determined for deeper zones and vertical gradients will not be determined. Additional comments on groundwater level monitoring are provided in Additional non-RAMP work comments and in Appendix G comments, below.

t) Please include all RAMP wells, all supplemental monitoring wells (including ZVI wells), all bedrock wells and all deeper wells in the groundwater level monitoring program.

u) Please explain why only 3 Parcel B wells (IR26MW46A, 47A and 48A) are inspected quarterly (Table F-1), and these three wells are non-RAMP wells which have been recently installed. Why are RAMP wells not inspected quarterly prior to sampling? Clarify whether the source of "roots" noted on sampling forms for IR10MW12A has been identified: has this well been compromised?

v) Error (Table F-2). Total depths of IR07MW29A and 30A are not correct.

4. Additional non-RAMP work on Parcel B
   a) As noted above, IR06 is in Parcel B (not C). The IR06 plume should not be shown as part of RU-C5 groundwater plume (e.g., Figure 8A), since it is located in Parcel B.

   b) The extent of the VOC plumes for IR25 and IR-06 and all recent groundwater monitoring data for IR06 and IR25 should be shown on Parcel B figures, so that potential impacts to Parcel B and locations for new wells can be evaluated.

   c) Vinyl chloride (VC) up to 1000 ug/L has been measured in IR06 (at post-RI well IR06MW59A1: TM Figure 4-30. Much higher concentrations of VC have been measured in adjacent IR25 (which is on Parcel C). PCE, TCE, and DCE have also been measured at elevated concentrations at IR06MW59A1 along with benzene. No VC values are provided at IR06MW59A1 for RAMP fourth quarter sampling (TM Figure 4-39). No monitoring wells exist west and north of IR06MW59A1. Additional investigation would be prudent to west and north of 59A1 to ensure that VOCs have not migrated. This is especially critical, given: the very high concentrations measured, the toxicities of some VOCs, and the unrestricted residential reuse of the ROD.

   d) Since IR06 is a potential DNAPL site, wells should be located on the upper surface of the shallow bedrock layer to determine if DNAPL is migrating along topological gradients. The bedrock gradient is toward the north and west of IR06MW59A1 (RI Figure 3.7-5): more wells are needed in this area.

   e) In the IR06 area, groundwater flow directions on Figures 4 and 8A do not agree with those on Figures 3 and G-1 in IR06 area. Figures 4 and 8A show strong direction to the east southeast onto Parcel C (contrary to site subsurface topography), but Figures 3 and G-1 show significant flow to the north into Parcel B. The latter interpretation is more consistent with RI figures. More data points are needed to clarify groundwater flow directions. Additional wells are needed for water level measurements to the north of IR06MW59A1 (where additional information is also needed on plume extent).

   f) The trough along Lockwood Street (near utility well IR06MW42A) is a dominant flow feature between IR06 (on Parcel B) and IR25 (on Parcel C). This trough is likely controlled by pumping of the sanitary system: when the pumping regime is changed during site development, flow directions will likewise change. Please clarify whether changes to the pumping regime are expected during the field work for the BGMP: if so, additional wells may need to be included in the groundwater level measurement program.

   g) Please clarify how various wells are being interpreted with respect to aquifer zones. Some "F" (i.e., "bedrock") wells are assigned to the A aquifer on Figure

8A (e.g., IR06MW52F and 53F), but other "F" wells are not (e.g., IR06MW47F, 52F, 53F and new well IR25MW62F).

h) IR06MW50F and 56F should be added to the groundwater level measurement program, to include data points in the F (bedrock) zone surrounding IR06. Paired wells IR06P54FA and P54FB should also be included.

i) Many wells have been removed in the IR06 area including several wells with high concentrations (e.g., IR06MW 22a, 30A, 32A). More wells may be needed within plume boundaries to replace removed wells. This is difficult to evaluate without updated figures showing historical concentrations.

j) At IR26 (i.e., 26-2), TCE at high concentrations (21 mg/kg) was measured in soil but TCE was mistakenly not identified as a compound of potential concern (COPC) for 26-2, as discussed in DTSC's comments on the Parcel B Construction Summary Report (CSR). It is not known whether VOCs have impacted groundwater or whether soil sources still exist at IR26: more investigation may be prudent at this time.

k) At least one well west of IR26MW46A and 48A, is needed--to evaluate effects of the large subsurface drainage channel. The drainage channel should be added to figures. The drainage channel should be investigated.

l) An industrial drain line (IDL) traverses the entire parcel. The IDL was described (email from Richard Mach, November 6, 2001) as follows: "Newly discovered construction drawings (circa 1956) indicate that a 10" glazed vitrified clay pipeline (VCP) may have been a gravity flow drain for some former industrial activities in Parcel B. This pipeline was overlooked in previous investigations, because more recent documents identify it as an abandoned portion of the sanitary sewer collection system. The pipeline appears to originate in IR10, between Buildings 123 and 134 (at about 2 feet bgs) flows approximately 1,200 feet to the northwest under Lockwood Street to a former discharge point, currently in IR-07 (at approximately 12 feet bgs)." In the Construction Summary Report (CSR) the IDL was identified as a site, but the IDL was not investigated. On BGMP figures, the IDL is not identified as a site, but is shown as a submerged sanitary line. Please revise BGMP figures to show the IDL as a site, and revise the legend accordingly. Effects of the IDL on groundwater have not been fully determined.

m) An additional well downgradient of IR56 (in the direction of the bay) may be needed to monitor the zinc plume at IR56.

n) There are only 2 B-aquifer wells (IR18MW100B and 101B) on Parcel B, and both are located near the western property boundary. The nature and extent of contamination has not been determined in the B-aquifer. Gradients (both horizontal and vertical) and other aquifer properties have also not been determined.

o) It is noteworthy that there are no B-aquifer wells monitoring VOC contamination at IR10, where there is no aquitard between A- and B-aquifers. The deeper aquifer should be investigated. At the minimum, deeper wells should be installed in VOC areas to check whether contamination (both dissolved phase and dense non-aqueous phase liquid (DNAPL)) has migrated vertically. In the IR06 area, where bedrock is shallow, density-driven DNAPL migration would follow bedrock contours. Has IR06 been investigated for DNAPL along topological gradients?

p) Proposals for additional non-RAMP work on Parcel B could not be fully evaluated because all groundwater, soil gas, and soil data (e.g., IR10 ZVI TS) have not been provided and because all areas have not been investigated (e.g., industrial drain line). With respect to such areas, review of proposals is postponed pending review of data.

q) With respect to analytical program, non-RAMP wells (i.e., supplemental monitoring wells) should satisfy the minimum requirements for RAMP wells (discussed above).

r) For new wells, the full suite of analytes must be analyzed for, since the groundwater at new well locations has not been characterized. For example, IR26 wells should be analyzed for the full suite and B-aquifer wells should be analyzed for the full suite.

s) New wells and all groundwater sampling in Parcel B should comply with detailed RAMP requirements for well installation, development, etc. discussed above.

t) Cyanide and ammonia were "surprise" contaminants on Parcel E with respect to potential impacts to the bay. Please confirm that cyanide and ammonia have been fully evaluated with respect to threats to the San Francisco Bay. In particular, all wells adjacent to the bay and all wells near plating operations should be assessed (e.g., IR10).

u) Evaluation of proposed non-RAMP work was hampered because contradictory information was presented regarding wells removed and wells remaining on site. For example, please clarify whether RAMP "volatile organic compound (VOC)" well IR10MW33A and RAMP on/off site monitoring wells IR07MW28A and IR18MW200A still exist. With respect to decommissioning, the following wells are portrayed differently on Figures 4 and G-1: IR18MW20A, IR07MW27A, IR07MW28A, IR10MW33A, IR23MW14A, IR60MW04A, IR60MW10A, IR46MW42A, IR07MWS-3 and 26A (one unnamed well still shown on Figure G-1). Please include all decommissioned wells ("x"ed out) on all figures. And, resolve discrepancies between figures, tables and text.

5. <u>Parcel B groundwater and ROD amendments</u>

a) A Parcel B Record of Decision (ROD) amendment has been under discussion for several years now. The ROD states (page 3): "The Navy recognizes that a change to the groundwater remedy may require a ROD amendment." However, no mention is made in the BGMP of the ROD amendment. Some changes seem likely—for example, new wells will be required for the expanded VOC plume at IR10. And, some ROD revisions are incorrectly assumed in the BGMP, as noted above (e.g., revised parcel boundaries at IR06 and IR25). In a ROD amendment, a change in remedial actions (including perhaps institutional controls) may be proposed for all VOC plumes, including plumes at/from IR06 and IR25, due to lowered preliminary remedial goals (PRGs) for VOCs in indoor air.

   Detailed discussions on Parcel B groundwater and the ROD amendment between agencies and the Navy would be prudent at this time, so that any additional data needed to support proposed changes may be identified and collected in a timely fashion. All data should be provided for review prior to developing the ROD amendment.

b) Monitoring of VOC contamination at IR10 is required by the Parcel B Record of Decision (ROD). Two new IR25 (Parcel C) VOC plume wells (IR25MW61A and 61A2) are proposed for installation inside Parcel B. In the ROD amendment, these wells should be identified as "Parcel B VOC monitoring wells" since these wells will monitor the IR25 plume as it passes under Parcel B. Such VOC wells should be identified as Parcel B wells because inhalation risks to Parcel B residents and workers are the critical concerns. Remedies, including engineering controls and institutional controls, will need to be considered in the Parcel B ROD amendment for all VOC plumes under Parcel B.

c) With respect to contaminants of potential concern (COPCs), the ROD focused on ecological threats to the San Francisco Bay and on inhalation risks at IR10. Inhalation risks at other sites and drinking water risks were not considered. All contaminants which might pose a risk to human health were not identified as COPCs, and plumes were not defined with respect to human health risks (except for VOCs at IR10). Therefore, the extent of contamination with respect to human health risks has not been fully defined. Some examples: PAHs at IR06MW42A and arsenic in IR18.

   In preparation for the ROD amendment, all existing data should be screened against updated risk-based criteria (human-health and ecological) and tables and figures provided which illustrate all exceedences of risk-based criteria.

6. Parcel B Trigger Levels
   a) Parcel B trigger levels given on Table C-1 do not agree with Parcel B ROD trigger levels (Table 10). Please provide all trigger levels given in the ROD. For completeness of the record, if trigger levels were formally changed post-ROD,

provide both ROD levels and revised trigger levels and cite the appropriate primary documents which formalized the revisions.

For example, trigger levels are provided in the ROD but not in the BGMP for semi-volatile organic compounds (SVOCs: hexachloroethane, naphthalene, pentachlorophenol, phenanthrene), benzene, chloroform, 2,6-dinitrotoluene, heptachlor epoxide, and total petroleum hydrocarbons quantified as gasoline and diesel (TPH-g and TPH-d). 2,6-dinitrotoluene is not included on BGMP Table C-1. No trigger level is provided for hexavalent chromium: for other metals, trigger levels in the BGMP do not agree with ROD trigger levels. All volatile organic compounds (VOCs) are not included: please include ROD trigger levels for all VOCs.

Trigger levels based on human health are provided in the ROD (Table10) for 7 VOCs: these are cis- and trans-dichloroethene (DCE), TCE, tetrachloroethene (PCE), 1,1,2,2-tetrachloroethane (TCA), 1,1,1-TCA and vinyl chloride (VC).

b) Footnote q (BGMP Table C-1) says: "POC and sentinel well trigger levels for 1,2-DCE were reduced from 22,400 and 224, 000 ug/L, respectively, as listed at Parcel B RAMP (Tetra Tech 1999), to a trigger level of 85 ug/L for both wells, because 1,2 DCE criteria are based on human health". Footnote r is similar, with respect to TCE. These footnotes are confusing. They are confusing because they imply that a change was made post-ROD but the trigger levels quoted are ROD trigger levels. Footnote q is also inaccurate since aquatic criteria in the ROD are 113,000 (not 24, 000) and 224,000 ug/L for DCE.

In lieu of footnotes q and r, it is preferable to quote footnote "*" of the ROD (Table 10), which says: "Human-health based criteria were developed for VOCs that may represent a human health risk to a future resident at Parcel B. Concentrations of these VOCs in groundwater correspond to an ELCR [excess lifetime cancer risk] of 10^{-6} and were selected as a groundwater RAO [remedial action objective] for protection of human health based on groundwater to indoor air modeling analysis".

However, footnote "*" of the ROD is no longer correct: for some VOCs, trigger levels no longer correspond to 10^{-6} ELCR and may not be sufficiently protective. The Navy should acknowledge this and propose new trigger levels for VOCs which incorporate new toxicological research, especially with regard to inhalation risks.

c) Regarding new trigger levels, the Federal Facility Agreement (FFA: Section 7.10 Subsequent Modification of Final Documents, paragraph (a)) says: "Any party may seek to modify a document after finalization if it determines, based on new information (i.e., information that becomes available, or conditions that become known, after the document was finalized) that the requested modification is necessary...by submitting a concise written request to the Remedial Project

Managers of the other Parties... The request shall specify the nature of the requested modification and how the request is based on new information." Accordingly, the Navy should explain the need for modification of trigger levels (for VOCs and other compounds, as appropriate) and provide human-health calculations and/or supporting documentation for review by DTSC toxicologists.

d) Review of ecological criteria for the protection of the San Francisco Bay is deferred to the RWQCB. Please note that Marshak's 2000 values for RWQCB Central Valley do not apply to the Bay Area. For example, please confirm whether Bay Area values exist for several metals not included in Marshak's compilation (e.g., barium, beryllium, chromium, cobalt, manganese, thallium). Another example: RWQCB requested that the Navy use the bioaccumulation criterion for consumption of aquatic organisms for polychlorinated biphenyls (PCBs): this criterion is .0017 ug/L (which is lower than the BGMP aquatic criteria .03 ug/L).

7. Well decommissioning
   a) Many wells have been removed at Parcel B and elsewhere on the Hunters Point site. No workplans for well decommissioning have been located in the site file: similarly, closure reports were not located. Well decommissioning has not been reviewed and approved.

      Please clarify whether all wells have been properly decommissioned and that California well standards have been met (e.g., grouting to total depths and/or perforation if necessary). Administrative requirements of the permitting process for decommissioning do not need to be met but substantive requirements do. Field forms for decommissioning for each well should be provided which demonstrate that appropriate procedures were performed.

   b) Well standards (Department of Water Resources Bulletins 74-81 and 74-90) can be found at: http://www.groundwater.water.ca.gov/technical_assistance/gw_wells/gww_standards/index.cfm.

   c) "Planned decommissioned wells" are indicated on figures (e.g., Figure 8A): a workplan should be provided for well decommissioning.

   d) The text says (Section 8.3.1): "Any wells that cannot be properly repaired will be decommissioned and replaced, if necessary". Please provide a workplan for well decommissioning.

8. Methane. Methane has been measured at other site locations in addition to the landfill (IR1/21) during groundwater sampling and in early investigations (Solid Waste Air Quality Assessment Test, Naval Station, Treasure Island, Hunters Point Annex, San Francisco, California (SWAT) dated August 4, 1989, and Reconnaissance Activities Report/Feasibility Studies, Naval Station Treasure Island,

Hunters Point Annex, San Francisco, California (RAR) dated August 9, 1990 (both by Harding Lawson Associates, Inc.) Although IR1/21 has been investigated, other sites have not been fully investigated with respect to methane and other landfill gases (LFG). Additional soil gas investigations might be prudent in areas in or adjacent to residential reuse areas and in disposal areas (e.g., IR07 and IR18). Instructions to field crews regarding methane (Section 8.3.3.1) should be expanded to include other areas of the site, including Parcel B.

9. Well repair
   a) Unacceptable well conditions have been commonly noted at the site. Well conditions improved with the site-wide well inspection program in 2002. But some problems identified in 2002 have not yet been addressed. Also, the current condition of wells is unknown, since wells have not been inspected since 2002 (with few exceptions). All wells should be inspected at least annually: wells for sampling or groundwater level measurements should be inspected and repaired prior to each field event. Such inspection and repair is proposed in the BGMP for each sampling event (Section 8.3.1): confirm that the inspection and repair also applies to water level measurement wells. Please include completed "Monitoring Well Inspection Forms" in the data evaluation report for the BGMP and update Table F-1 as needed.

   b) Corrective action is requested for the following well conditions identified in Appendix F: IR18MW12A (resurvey); IR10MW14A (provide lock).

Specific Comments

1. Section 1.1.1 Purposes of the Groundwater Monitoring Program
   a) The text says: "The basewide GWMP will also incorporate Year 5 of the Parcel B remedial action monitoring plan (RAMP)". As noted in General Comments, it is not appropriate to include RAMP monitoring and modifications in the BGMP. Please delete this statement and all similar statements. But, with respect to site history, please include dates for Year 5.

2. Section 1.1.2 Problem to Be Solved
   a) The text says: "The Navy also wants to include monitoring required under the Parcel B Record of Decision (ROD) (Navy 1997), which has heretofore been documented under its own quarterly monitoring program..." As noted in General Comments, it is not appropriate to include RAMP monitoring and modifications in the BGMP. Please delete.

   b) The text says: "At Parcel B, groundwater is monitored under an existing RAMP, which will continue until 5 years of monitoring is completed." Please include date when five years of monitoring will be completed.

   c) The text says: "Additional wells proposed for monitoring beyond the RAMP requirements are including in this SAP." The Navy should revise the BGMP so

that RAMP wells and requirements are clearly distinguished from other additional wells and proposed additional monitoring.

d) Separate notation should be used on figures for actual RAMP wells. For example, on Figure 4, IR10MW12A is identified as "dual purpose hexavalent chromium and VOC monitoring well": but this well is designated as a "VOC monitoring well" in the RAMP.

e) All "problems" that need to be solved are not addressed in this section or in the BGMP, as indicated in comments.

3. Section 1.1.3 Facility Background. Operations of the National Radiological Defense Laboratory (NRDL) on Parcel B (and elsewhere) should be included.

4. Section 1.1.5 Site Description. The site description should include the fact that most of Hunters Point Shipyard (including most of Parcel B) was constructed on fill materials (referring to the 1935 shoreline on Figure 3), and that the fill history is largely undocumented.

5. Section 1.1.6.2 Parcel B Remedial Action Monitoring Plan. This section describes the ROD components of the groundwater remedy: but, the information provided is not sufficient. The ROD (Section 1.4 Description of the Remedy), contains a description of the approach to the groundwater remedy including: sentinel wells, compliance wells, criteria, etc. A description of the ROD approach to groundwater should be included in the text.

6. Section 1.2.1 Project Objectives. Delete references to RAMP replacement wells.

7. Section 1.6.4 Reports Generated. Parcel B RAMP reporting requirements apply to RAMP wells.

8. Modified low-flow purging (Section 8.3.4.2). Please provide references in support of the modified low-flow purging proposed. In particular, explain how the process in not disruptive to VOCs (i.e., multiple changes in water pressure). Also, explain how the threshold value of .33 foot at 0.15 L/min was determined.

9. Quality control (QC: Section 8.6) and data validation (Section 10.). Review of QC and data validation is deferred to USEPA.

10. Table C-1
    a) Change the column title "POC well trigger level" to "Parcel B RAMP POC well trigger level".
    b) Footnotes "q" and "r" are discussed above.

11. Appendix G

a) Please revise Figures G-1 and G-2 (which show wells selected for groundwater level monitoring) to include all site wells so that the reviewers can properly evaluate the proposed program and make recommendations for additional or different wells to be included.

b) There are many discrepancies between figures with regard to decommissioned wells, especially in Parcel B. In addition, on Figure G-1, all wells are not included, all well names are not included, all removed wells are not noted as such (e.g., near IR07MW29A). On Figure 3, some well names are "floating" on the figure—unassociated with well locations (especially in the eastern portion). As a result, it is not possible to fully review the program for water level measurements in Parcel B.

c) Groundwater flow in two regions of Parcel B is controlled by a mound and a sink. Changes to the sanitary system pumping regime will affect these features, as discussed above. The Navy should determine the causes (e.g., blocked and submerged storm lines, interconnected storm/sanitary lines) of mounds and sinks, including the trough between IR06 and IR25 and the large elliptical mound in the eastern portion of Parcel B.

d) The Navy should assess the impacts of utility repairs (if any) on groundwater flow.

e) Vertical and horizontal gradients and flow directions will not be determined by the proposed program. Only two B-aquifer wells exist in Parcel B, on IR18, near the western boundary: these two wells (IR18MW100B and 101B) are not sufficient to determine horizontal gradients and flow directions. Also, they are not paired with shallow wells so vertical gradients can not be determined.

f) The B-aquifer under Parcel B may be separated into 2 zones (e.g., at IR18 and at IR10) by subsurface bedrock ridges. If so, both zones of the B-aquifer may need to be investigated separately (i.e., with respect to chemical analysis, gradients, properties, etc.)

g) At IR10, a VOC site and potential DNAPL site, the B-aquifer underlying the hole in the aquitard at IR10 has not been investigated and no B-aquifer wells exist. Vertical and horizontal gradients have not been determined. And, it has not been determined if contamination (dissolved and DNAPL) has migrated to deeper zones.

h) More wells are required to monitor the Parcel B boundary (near removed well IR07MW28A).

i) Two wells for IR06 for water level measurement (IR06MW22A and 49F) are shown as decommissioned on Figure G-1. Why were these wells removed? Replacement wells should be considered.

j) Another well for water level measurement should be considered east of IR25MW16A. Repaired water lines are shown on Figure 3.

k) At treatability study (TS) areas, a denser distribution of monitoring points for groundwater level measurement is necessary--especially at pumping or injection areas. For example, at IR10 in Parcel B, nine wells have been removed surrounding Building 123 and six new wells have been installed inside and adjacent to Building 123, but few wells are selected for water level measurements. More wells should be selected for groundwater level measurements: at a minimum, please include "VOC monitoring wells", "dual purpose well", and "ZVI [zero-valent ion] VOC monitoring wells".

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